Amendment to the claims:

Claims 1-32 (Canceled)

Claim 33. (Currently amended) A method of refining a first and a second layer of a
semiconductor wafer, each having an effect on a cost of manufacture, the method
comprising:

applying a first refining energy to the first layer of the semiconductor wafer for a
first layer refining;

sensing a real time process information for the first layer of the semiconductor
wafer during the first layer refining with an at least one operative sensor for
the first layer refining;

determining an improvement in real time for an at least one first layer control
parameter "A" using a tracking code of the semiconductor wafer and the real
time process information for the first layer of the semiconductor wafer with an
operative control subsystem for the first layer refining;

controlling in real time the at least one first layer process control parameter "A" to
change a first semiconductor wafer surface during the first layer refining of
the first layer of the semiconductor wafer;

storing for future availability a stored information related to the at least one first
layer process control parameter "A", the tracking code of the semiconductor
wafer, and the real time process information for the first layer of the
semiconductor wafer;

applying a second refining energy to the second layer of the semiconductor wafer
having an at least one second layer control parameter "B" for a second layer
refining;

sensing a real time process information for the second layer of the semiconductor
wafer during the second layer refining with an at least one operative sensor for
the second layer refining;

determining an improvement in real time for the at least one second layer control
parameter "B" using at least a portion of the stored information related to the

tracking code of the semiconductor wafer, the real time process information

for the first layer of the semiconductor wafer, and the real time process

information for the second layer of the semiconductor wafer with an operative

control subsystem for the second layer refining; and

controlling in real time the at least one second layer process control parameter "B"

to change a second semiconductor wafer surface during the second layer

refining of the second layer of the semiconductor wafer; wafer: and

using an at least one process model and using a predictive control during the

method.

Claim 34. (Currently amended) The method according to claim 33 wherein controlling in

real time the at least one first layer process control parameter "A" comprises

controlling in real time the at least one first layer process control parameter "A" to

change a removal of a material from the first semiconductor wafer surface during the

refining of the first layer of the semiconductor wafer.

Claim 35. (Previously amended) The method according to claim 33 wherein applying the

first refining energy comprises applying at least two independent refining energies.

Claim 36. (Previously amended) The method according to claim 33 wherein applying the

first refining energy comprises applying at least two different refining energies.

Claim 37. (Previously amended) The method according to claim 33 wherein applying the

first refining energy comprises applying at least two different, independent refining

energies.

Claim 38. (Previously amended) The method according to claim 33 wherein applying the

first refining energy comprises applying at least one electrochemical energy for

removing a material from the first semiconductor wafer surface.

Claims 39-40 (Cancelled)

Claim 41. (Previously amended) The method according to claim 33 wherein applying the second refining energy comprises applying at least two independent refining energies.

Claim 42. (Previously amended) The method according to claim 33 wherein applying the second refining energy comprises applying at least two different refining energies.

Claim 43. (Previously amended) The method according to claim 33 wherein applying the second refining energy comprises applying at least two different, independent refining energies.

Claim 44. (Currently amended) The method according to claim 33 wherein applying the second refining energy comprises applying at least one electrochemical energy for removing a material from the second semiconductor wafer surface.

Claim 45. (Currently amended) The method according to claim 33 wherein applying the second refining energy comprises applying at least one electrochemical energy for adding a material to the second semiconductor wafer surface.

Claim 46. (Currently amended) The method according to claim 33 wherein:
controlling in real time the at least one first layer process control parameter "A" comprises controlling in real time the at least one first layer process control parameter "A" to change a removal of a material from the first semiconductor wafer surface during the first layer refining of the semiconductor wafer; and controlling in real time the at least one second layer process control parameter "B" comprises controlling in real time the at least one second layer process control parameter "B" to change a removal of the material from the second

semiconductor wafer surface during the refining of the second layer of the semiconductor wafer.

Claim 47. (Previously amended) The method according to claim 33 wherein:

applying the first refining energy comprises applying at least two independent refining energies; and

applying the second refining energy comprises applying at least two independent refining energies.

Claim 48. (Previously amended) The method according to claim 33 wherein:

applying the first refining energy comprises applying at least two different refining energies; and

applying the second refining energy comprises applying at least two different refining energies.

Claim 49. (Previously amended) The method according to claim 33 wherein:

applying the first refining energy comprises applying at least two different, independent refining energies; and

applying the second refining energy comprises applying at least two different, independent refining energies.

Claim 50. (Currently amended) The method according to claim 33 wherein:

applying the first refining energy comprises applying at least one electrochemical energy for removing a material from the first semiconductor wafer surface; and

applying the second refining energy comprises applying at least one electrochemical energy for removing the material from the second semiconductor wafer surface.

Claim 51. (Currently amended) The method according to claim 33 wherein:

applying the first refining energy comprises applying at least one electrochemical energy for adding a material to the first semiconductor wafer surface; and

applying the second refining energy comprises applying at least one electrochemical energy for adding the material to the second semiconductor wafer surface.

Claims 52 – 76 (Cancelled)

Claim 77. (Previously added) The method according to claim 33 wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method.

Claim 78. (Previously added) The method according to claim 77 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 77.

Claim 79. (Previously added) The method according to claim 33 wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method; and wherein the semiconductor wafer comprises a semiconductor wafer having a diameter of at least 300 millimeter; and additionally comprising:
using a refining element having a refining element identification code during the method.

Claim 80. (Previously added) The method according to claim 79 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 79.

Claim 81. (Previously added) The method according to claim 37 wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 82. (Previously added) The method according to claim 81 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 81.

Claim 83. (Previously added) The method according to claim 38 wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method; and
wherein the semiconductor wafer comprises a semiconductor wafer having a diameter of at least 300 millimeters.

Claim 84. (Previously added) The method according to claim 49 wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 85. (Previously added) The method according to claim 84 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 84.

Claim 86. (Previously added) The method according to claim 49 wherein using an at least one process model comprises using at least in part a first principles process model; and additionally comprising:
using a refining element having a refining element identification code during the method.

Claim 87. (Previously added) The method according to claim 86 additionally comprising:

using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 86.

Claim 88. (Previously added) The method according to claim 50 wherein using an at least one process model comprises using at least in part a first principles process model; and

wherein the semiconductor wafer comprises a semiconductor wafer having a diameter of at least 300 millimeters.

Claim 89. (Previously added) The method according to claim 88 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 88.

Claim 90. (Previously added) The method according to claim 51 wherein using an at least one process model comprises using at least in part a first principles process model; and

wherein the semiconductor wafer comprises a semiconductor wafer having a diameter of at least 300 millimeters.

Claim 91. (Previously added) The method according to claim 90 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 90.

Claim 92. (Currently amended) The method according to claim 33 wherein at least one of applying a first refining energy or applying a second refining energy comprises applying an at least one electrochemical energy for adding a material and wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0; and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 93. (Currently amended) The method according to claim 33 wherein at least one of applying a first refining energy or applying a second refining energy comprises applying an at least one electrochemical energy for removing a material and wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0; and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 94. (Previously added) The method according to claim 93 wherein applying a first refining energy comprises applying at least two different independent refining energies or wherein applying a second refining energy comprises applying at least two different independent refining energies.

Claim 95. (Previously added) The method according to claim 94 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 94.

Claim 96. (Previously added) The method according to claim 33 wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method and wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0; and additionally comprising:
using a refining element having a refining element identification code during the method.

Claim 97. (Previously added) The method according to claim 96 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 96.

Claim 98. (Currently amended) The method according to claim 33 wherein at least one of applying a first refining energy and applying a second refining energy comprise applying at least one electrochemical energy for adding a material and applying at least

one electrochemical energy for removing the material and wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0; and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 99. (Previously added) The method according to claim 98 additionally comprising: using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 98.

Claim 100. (Previously added) The method according to claim 98 additionally comprising:

supplying a group of an at least three apparatus wherein each member of the group of the at least three apparatus has at least two refining elements and an at least two different refining element identification codes, the refining element identification codes forming a family of an at least six refining element identification codes, each refining element identification code being different from each other and wherein each of the at least three apparatus includes at least two electrodes;

using an at least one processor having access to the family of the at least six refining element identification codes for the at least three apparatus; and

using a manufactured article having a processor readable medium with processor readable instructions which use the family of the at least six refining element identification codes to determine a change for an at least one control parameter during a refining cycle time.

Claim 101. (Previously added) The method according to claim 33 wherein applying a first refining energy comprises applying at least two different independent electrochemical refining energies and wherein applying a second refining energy comprises applying at least two different independent electrochemical refining energies

and wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0 and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 102. (Previously added) The method according to claim 101 additionally comprising:

using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 101.

Claim 103. (Previously added) The method according to claim 101 additionally comprising:

supplying a group of an at least three apparatus wherein each member of the group of the at least three apparatus has at least two refining elements and an at least two different refining element identification codes, the refining element identification codes forming a family of an at least six refining element identification codes, each refining element identification code being different from each other and wherein each of the at least three apparatus includes at least two electrodes;

using an at least one processor having access to the family of the at least six refining element identification codes for the at least three apparatus; and

using a manufactured article having a processor readable medium with processor readable instructions which use the family of the at least six refining element identification codes to determine a change for an at least one control parameter during a refining cycle time.

Claim 104. (Previously added) The method according to claim 33 wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k

value of at most 3.0; and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 105. (Previously added) The method according to claim 104 additionally comprising:
using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 104.

Claim 106. (Previously added) The method according to claim 104 additionally comprising:
data mining the stored information.

Claim 107. (Previously added) The method according to claim 33 wherein the semiconductor wafer comprises a semiconductor wafer having a low-k layer having a k value of at most 3.0; and wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method; and additionally comprising:
using a refining element having a refining element identification code during the method.

Claim 108. (Previously added) The method according to claim 107 additionally comprising:
using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 107.

Claim 109. (Previously added) The method according to claim 107 additionally comprising:
data mining the stored information.

Claim 110. (Previously added) The method according to claim 33 wherein the semiconductor wafer has a diameter of at least 300 millimeters and wherein the semiconductor wafer has a low-k layer having a k value of at most 3.0; and additionally comprising:

changing the cost of manufacture by an appreciable amount.

Claim 111. (Previously added) The method according to claim 110 additionally comprising:

using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 110.

Claim 112. (Previously added) The method according to claim 33 wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method; and additionally comprising:

changing the cost of manufacture by an appreciable amount.

Claim 113. (Previously added) The method according to claim 112 additionally comprising:

using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 112.

Claim 114. (Previously added) The method according to claim 33 wherein using an at least one process model comprises using at least in part a first principles process model and at least in part an empirically based process model for the predictive control during the method and wherein the semiconductor wafer has a diameter of at least 300 millimeters and wherein the semiconductor wafer has a low-k layer having a k value of at most 3.0 and additionally comprising:

changing the cost of manufacture by an appreciable amount.

Claim 115. (Previously added) The method according to claim 114 additionally comprising:

using a manufactured article having a processor readable medium with processor readable instructions for performing the method of claim 114.

Claim 116. (Previously added) The method according to claim 114 additionally comprising:

supplying a group of an at least three apparatus wherein each member of the group of the at least three apparatus has at least two refining elements and an at least two different refining element identification codes, the refining element identification codes forming a family of an at least six refining element identification codes, each refining element identification code being different from each other;

using an at least one processor having access to the family of the at least six refining element identification codes for the at least three apparatus; and

using a manufactured article having a processor readable medium with processor readable instructions which use the family of the at least six refining element identification codes to determine a change for an at least one control parameter during a refining cycle time.

Claim 117. (Previously added) The method according to claim 33 additionally comprising:

supplying a group of an at least three apparatus wherein each member of the group of the at least three apparatus has at least two refining elements and an at least two different refining element identification codes, the refining element identification codes forming a family of an at least six refining element identification codes, each refining element identification code being different from each other;

using an at least one processor having access to the family of the at least six refining element identification codes for the at least three apparatus; and

using a manufactured article having a processor readable medium with processor readable instructions which use the family of the at least six refining element identification codes to determine a change for an at least one control parameter during a refining cycle time.

Claim 118. (Currently amended) The method according to claim 117 wherein at least one of applying a first refining energy or applying a second refining energy comprises applying an at least one electrochemical energy for removing a material and wherein using an at least one process model comprises using at least in part a first principles process model for the predictive control during the method.

Claim 119. (Previously added) The method according to claim 118 additionally comprising:
changing the cost of manufacture by an appreciable amount.

Claim 120. (Previously added) The method according to claim 118 additionally comprising:
data mining the stored information.